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## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Dias et al.

Serial No.: 09/551,745

Filed: April 18, 2000

For: REAL-TIME SHARED DISK SYSTEM FOR  
COMPUTER CLUSTERS

Art Unit: 2188

Examiner: Namazi

AM9-98-080C

March 25, 2004  
750 B STREET, Suite 3120  
San Diego, CA 92101

OFFICIAL

RESPONSE TO OFFICE ACTIONCommissioner of Patents and Trademarks  
Washington, DC 20231

Dear Sir:

In response to the Office Action dated March 11, 2004, please amend the above-captioned application as follows:

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1. (currently amended) A computer system including plural client nodes communicating data access requests to one or more storage nodes, comprising:  
  
logic means for associating one or more of the data access requests with respective priorities,  
~~wherein the priorities include time based deadlines;~~  
  
~~logic means for sending the data access requests and priorities to the storage nodes; and~~  
  
logic means for ordering the data access requests ~~at the storage nodes~~ based on the respective priorities, such that the data access requests are satisfied in consideration of their respective priorities,  
wherein each storage node includes at least one storage computer and at least one data storage device,  
and the storage computer includes logic means for sending no more than one data access request at a time to the data storage device, such that the data storage device cannot reorder the sequence of responding to data access requests based on considerations internal to the data storage device.
  2. (canceled).
  3. (original) The system of Claim 1, further comprising:  
  
logic means for terminating at least one data access request.
  4. (original) The system of Claim 1, further comprising means for loosely synchronizing the computing and storage nodes with each other.
  5. (canceled).

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6. (original) The system of Claim 1, wherein the system is a virtual shared disk system.

7. (canceled).

8. (currently amended) In a computer system having plural processors communicating data access requests to a shared storage system, a computer-implemented method for satisfying at least two contemporaneous data access requests to a single data storage device of the shared storage system, comprising the steps of:

responding to the requests in an order defined at least in part by one or more considerations external to the data storage device, wherein the one or more considerations external to the data storage device include a data request priority; ~~including a time-based deadline~~

changing a priority of at least one data access request, prior to the request being satisfied by a storage node, to render an updated priority; and

reordering data access requests at the storage nodes, based on the updated priority.

9, 10. (canceled).

11. (original) The method of Claim 8, further comprising:

associating one or more of the data access requests with respective priorities;

sending the data access requests and priorities to storage nodes in the shared storage system, each storage node including at least one data storage device; and

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ordering the data access requests at the storage nodes based on the respective priorities, such that the data access requests are satisfied in accordance with their respective priorities.

12. (canceled).

13. (original) The method of Claim 8, further comprising:  
terminating at least one data access request, prior to the request being satisfied by a storage node.

14. (original) The method of Claim 8, further comprising loosely synchronizing the computing and storage nodes with each other.

15. (canceled).

16. (original) The method of Claim 8, wherein the system is a virtual shared disk system.

17. (currently amended) A computer program device comprising:  
a computer program storage device readable by a digital processing apparatus; and  
a program means on the program storage device and including instructions executable by the digital processing apparatus for performing method steps for satisfying one or more data access requests, the method steps comprising:

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associating at least some of the data access requests with respective priorities, ~~at least some of which are time-based; and~~

sending the priorities and the data access requests to a shared storage system, such that the shared storage system can respond to the requests in consideration of the priorities;

serving a request of a lower priority before a request of a later-arriving but higher priority, if a lower priority request queue is sufficiently short such that the lower priority request can be satisfied first, and the higher priority request satisfied within its priority.

18. (original) The computer program device of Claim 17, wherein the shared storage system is a virtual shared disk system and at least some of the priorities are time-based deadlines.

19. (canceled).

20. (currently amended) The computer program device of Claim [19]17, wherein the method steps further comprise:

terminating at least one data access request, prior to the request being satisfied by the shared storage system.

21. (original) The computer program device of Claim 17, wherein the method steps further comprise loosely synchronizing the data access requests with each other.

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22. (currently amended) A computer program device comprising:  
a computer program storage device readable by a digital processing apparatus; and  
a program means on the program storage device and including instructions executable by the digital processing apparatus for performing method steps for satisfying one or more data access requests, the method steps comprising:

responding, with a memory system, to at least some of the data access requests based on respective priorities, the priorities and the data access requests being sent to the memory system, ~~wherein at least some priorities are time-based; wherein~~

the memory system includes at least one controller and at least one associated disk, the controller combining at least one priority with ordering based on an internal state of the associated disk.

23, 24. (canceled).

priority ~~for~~ with ~~the~~ name

memory  
rotational  
seek time

reorder or re-order or order

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